

# NASA TECH BRIEF



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## Extended-Life Magnetic Recording Heads

An extended-life magnetic recording head has been developed in which a standard ferrite core is directly coated with a thin film of a magnetic alloy. The recording head thus coated has a lifespan from five to ten times longer than that of conventional heads. At the same time, it shows superior inductance characteristics and frequency response.

In the coating process, the alloy, composed of aluminum, iron, and silicon, is deposited on the ferrite core by the technique of plasma arc sputtering. An electrically isolated ferrite substrate is mounted in a vacuum chamber about 1-1/2 inches from a target made from the bulk alloy. Both target and substrate are positioned midway between a filament and an anode that is maintained at a potential of 700 volts. During the sputtering process, the target is cooled by liquid from an external refrigeration unit. Initially, the chamber is evacuated to approximately  $10^{-6}$  torr, the target is given a high negative potential, and a filament is heated to emit thermionic electrons. These electrons, streaming toward the anode, create a plasma between the target and substrate.

At this point, the chamber pressure is raised to  $10^{-3}$  torr by the addition of high-purity argon gas. In the plasma, ionizing collisions occur between electrons and argon atoms, producing positively charged argon

ions. These ions bombard the target surface and dislodge particles of the alloy, which are then deposited on the ferrite substrate. Using this system, the rate of alloy deposition on the substrate ranges from 50 to 300 Å/min. Total thickness of the alloy coating may be varied from 0.0015 to 0.004 in.

The increased lifetime and improved properties of prototype alloy-coated magnetic recording heads has been measured in actual tests.

### Note:

No additional documentation is available. Specific questions, however, may be directed to:

Technology Utilization Officer  
Goddard Space Flight Center  
Code 207.1  
Greenbelt, Maryland 20771  
Reference: B70-10521

### Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

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